CONTACT ELECTRIFICATION AND TITANIUM DENTAL IMPLANT SURFACE MODIFICATION

OBJECTIVES: To study the contact electrification phenomena between grits and CP2 Ti during sandblasting which is a novel finding in surface modification of Ti dental implant.

METHODS: Our experiment investigates the possibility of applying contact electrification in modifying the surface charge of titanium dental implants. through sandblasting, which involves contacts and charge exchanges between the grits, the implant and air. Although sandblasting is commonly used for roughening the titanium surface, previous research has totally neglected its electrical effects.

Al_2O_3 grits with average diameter of 110 μm were used to blast machined CP2 titanium plates, with controlled compressed air pressure, and varying temperature and humidity conditions. CP2 titanium plates, were used in the experiments.

RESULTS: After sandblasting, static electric charges were present on the titanium surface. The amount of charge decreases with time, until reaching a stable level. Al_2O_3 grits produced negative charge on the titanium surface. Temperature and humidity seems to affect the amount of charge generated and its decaying rate.

CONCLUSIONS: Contact electrification on the titanium alloy surface is a novel finding involved in the sandblasting procedure, which appears to be promising for titanium surface charge modification. This potential effect of sandblasting is of further research interest. Charge generation and decay are affected by the temperature and humidity.